CLAIMS

What is claimed is:

1. A tuned transformer balun circuit comprises:

a transformer balun having a single-ended winding and a differential winding, wherein the single-ended winding includes a first node and a second node and the differential winding includes a first node, a center node, and a second node;

a first tuning capacitor having a first plate and a second plate, wherein the first plate of the first tuning capacitor is operably coupled to the first node of the differential winding and the second plate of the first tuning capacitor is operably coupled to a circuit ground;

a second tuning capacitor having a first plate and a second plate, wherein the first plate of the tuning capacitor is operably coupled to the second node of the differential winding and the second plate of the second tuning capacitor is operably coupled to the circuit ground; and

a third tuning capacitor having a first plate and a second plate, wherein the first plate of the third tuning capacitor is operably coupled to the first node of the single-end winding and the second plate of the third tuning capacitor is operably coupled to transceiver radio frequency signals, wherein, based on loading of the single-ended winding and the differential winding, the first, second, and third tuning capacitors resonate with the transformer balun.

2. The tuned transformer balun circuit of claim 1 further comprises:

a decoupling capacitor having a first plate and a second plate, wherein the first plate of the decoupling capacitor is operably coupled to the second node of the single-ended winding and to the center node of the differential winding and the second plate of the decoupling capacitor is operably coupled to the circuit ground to provide a low impedance AC ground connection over a range of frequencies.

3. The tuned transformer balun circuit of claim 1 further comprises:

the transformer balun residing on at least one layer of an integrated circuit, wherein the second node of the single-ended winding is operably coupled to an integrated circuit pin via a bond wire and wherein the integrated circuit pin is coupled to an antenna, wherein the bond wire and the antenna provide the loading of the single-ended winding.

4. The tuned transformer balun circuit of claim 3 further comprises:

the first node of the differential winding operably coupled to a first output transistor of a power amplifier, wherein the first output transistor includes parasitic capacitance; and

the second node of the differential winding operably coupled to a second output transistor of the power amplifier, wherein the second output transistor includes parasitic capacitance, wherein the first and second output transistors of the power amplifier provide the loading of the differential winding.

5. The tuned transformer balun circuit of claim 1, wherein the first, second, and third capacitors have a capacitance in the range of a tens of femto-Farads to tens of pico-Farads.

6. A radio frequency integrated circuit (RFIC) comprises:

a receiver section operably coupled to convert inbound radio frequency (RF) signals into inbound data;

a transmitter section operably coupled to convert outbound data into outbound RF signals; and

a tuned transformer balun circuit operably coupled to provide the inbound RF signals from an antenna to the receiver section and to provide the outbound RF signals to the antenna, wherein the tuned transformer balun circuit includes:

a transformer balun having a single-ended winding and a differential winding, wherein the single-ended winding includes a first node and a second node and the differential winding includes a first node, a center node, and a second node;

a first tuning capacitor having a first plate and a second plate, wherein the first plate of the first tuning capacitor is operably coupled to the first node of the differential winding and the second plate of the first tuning capacitor is operably coupled to a circuit ground;

a second tuning capacitor having a first plate and a second plate, wherein the first plate of the tuning capacitor is operably coupled to the second node of the differential winding and the second plate of the second tuning capacitor is operably coupled to the circuit ground; and

a third tuning capacitor having a first plate and a second plate, wherein the first plate of the third tuning capacitor is operably coupled to the first node of the single-end winding and the second plate of the third tuning capacitor is operably coupled to transceiver radio frequency signals, wherein, based on loading of the

single-ended winding and the differential winding, the first, second, and third tuning capacitors resonate with the transformer balun.

7. The RFIC of claim 6, wherein the tuned transformer balun circuit further comprises:

a decoupling capacitor having a first plate and a second plate, wherein the first plate of the decoupling capacitor is operably coupled to the second node of the single-ended winding and to the center node of the differential winding and the second plate of the decoupling capacitor is operably coupled to the circuit ground to provide a low impedance AC ground connection over a range of frequencies.

8. The RFIC of claim 6, wherein the tuned transformer balun circuit further comprises:

the transformer balun residing on at least one layer of an integrated circuit supporting the RFIC, wherein the second node of the single-ended winding is operably coupled to an integrated circuit pin via a bond wire and wherein the integrated circuit pin is coupled to an antenna, wherein the bond wire and the antenna provide the loading of the single-ended winding.

9. The RFIC of claim 8 further comprises:

the first node of the differential winding operably coupled to a first output transistor of a power amplifier, wherein the first output transistor includes parasitic capacitance; and

the second node of the differential winding operably coupled to a second output transistor of the power amplifier, wherein the second output transistor includes parasitic capacitance, wherein the first and second output transistors of the power amplifier provide the loading of the differential winding.

10. The RFIC of claim 6, wherein the first, second, and third capacitors have a capacitance in the range of a tens of femto-Farads to tens of pico-Farads.